

CLAIMS

1. Torque generating apparatus comprising:
  - (a) a DC power source of voltage  $V_s$ ;
  - (b) a DC/DC converter connected to said DC power source and adapted to convert DC power at said voltage  $V_s$  to DC power at an alternate voltage  $V_a$ ;
  - (c) a brushless DC motor design optimized for operation at said voltage  $V_s$ , said brushless DC motor being responsive power at said voltage  $V_s$  by achieving speed/torque combinations falling on a speed/torque profile defining optimal operation of said brushless DC motor, said brushless DC motor being further adapted to achieve speed/torque combinations not falling on said speed/torque profile by operating at said alternate voltage  $V_a$ , and
  - (d) a switch adapted to put said brushless DC motor selectively into communication with either said DC power source or said DC/DC converter.
2. Torque generating apparatus according to claim 1 wherein said DC/DC converter comprises a capacitor connected for selective charging to one or the other of voltages  $V_a$  and  $V_s$ .
3. Torque generating apparatus according to claim 2, wherein said switch comprises a field effect transistor connected for controlling a flow of current through said capacitor.
4. Torque generating apparatus according to claim 3 wherein said DC power source provides DC power at 12 V.
5. Torque generating apparatus according to claim 4 wherein said alternate power source provides power at 36 V.

6. In a motor vehicle having a DC power source designed for supplying direct current electricity at a design voltage  $V_s$ , torque generating apparatus comprising:

(a) a DC/DC converter connected to said DC power source so as to receive direct current electricity therefrom, said DC/DC converter being configured for converting said power source electricity into DC electricity at an alternate voltage  $V_a$ , substantially different from said source voltage  $V_s$ ;

(b) a signal selector configured to receive a first DC signal at said source voltage  $V_s$  and a second DC signal at said alternate voltage  $V_a$  and to generate a third DC signal by making a selection between said first and second DC signals ;

(c) a motor controller responsive to said third DC signal by generating motor control signals; and

(d) a DC motor, responsive to said motor control signals and designed for optimally generating torque in a motor vehicle equipped with an electrical system operating at said source voltage  $V_s$  and also able to generate torque in said motor vehicle, other than optimally, at speed/torque combinations reachable only during selection of said second DC signal by said signal selector..

7. In a motor vehicle; torque generating apparatus comprising:

(a) a brushless DC motor optimized for generating torque at speed/torque combinations along a prescribed speed/torque profile when activated by direct current at a predetermined design voltage, said brushless DC motor also being able to deliver torque at speed/torque combinations away from said profile when activated by a direct current at a predetermined alternate voltage, substantially different from said design voltage;

(b) a power supply providing current at said design voltage;

(c) a DC/DC converter having an input side connected to said power supply for receiving current at said design voltage said power supply and configured for converting current so received into direct current at said alternate voltage; and

(d) a switch having an output terminal connected to said brushless DC motor, a first input terminal connected to said DC/DC converter and a second input terminal connected to said DC power supply, said switch being operative for selectively powering said brushless DC motor at either said design voltage or said alternate voltage.

8. A method of generating torque comprising the steps of:
  - (1) Acquiring as DC motor, design optimized for operation at speed/torque combinations along a default speed/torque profile when activated by a design voltage  $V_s$ , and able to reach alternate speed/torque combinations not on said default speed/torque profile when activated by an alternate voltage  $V_a$  ;
  - (2) connecting said motor to an output terminal of a switch having first and second input terminals, as well as said output terminal;
  - (3) supplying power at said voltage  $V_s$  to said first input terminal;
  - (4) supplying power at an alternate voltage  $V_a$  to said second input terminal;
  - and
  - (5) positioning said switch to connect one of said input terminals to said output terminal, so that said motor runs selectively either at a speed/torque combination along said default speed/torque profile or at a speed/torque combination not on said default speed/torque profile.
9. A method according to claim 8, further comprising the step of generating power at said voltage  $V_a$  by conversion from power at said voltage  $V_s$ ;
10. A method according to claim 8, wherein said design voltage  $V_s$  is 12 volts;
11. A method according to claim 8, further comprising the step of connecting said motor to an automotive accessory.
12. A method according to claim 8 wherein said acquiring step is the step of acquiring a brushless DC motor, design optimized for operation at speed/torque combinations along a default speed/torque profile when activated by a design voltage  $V_s$ , and able to reach alternate speed/torque combinations not on said default speed/torque profile when activated by an alternate voltage  $V_a$ .